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A study of 3 schools in a severely impoverished rural Arkansas school district sought to determine the effects of an enrichment program initiated in one of the schools. Efforts were also made to determine and compare the achievement and resultant gains in intelligence, personality, and academic advancement of welfare recipient and non recipient children in each school. Analysis of variance indicated that there existed no significant differences between the 3 schools with regard to achievement of all students studied. Welfare recipient children performed at a lower level than non welfare recipients on the academic test. Children enrolled in the enrichment program at the experimental school made significantly higher gains than children at the other 2 schools. It was concluded that an enriched, small-group instructional setting is much superior to a nonenriched program of any size. (DA)

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EFFECTS OF AN ENRICHMENT PROGRAM ON THE SCHOOL ACHIEVEMENT OF RURAL WELFARE RECIPIENT CHILDREN *

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The problem of providing compensatory education for children of the poor is a "long over-due recognition of a fundamental weakness in American education (11)." Numerous studies (1, 2, 3, 5, 6, 7, 8, 9, 10, 11) support the thesis that the effects of experiential restriction during infancy and early childhood are relatively permanent under present educational assumptions and practices. Prevailing conditions of experiential restriction tend to be concentrated in the culture of poverty (10). The welfare class represents the most impoverished group in this nation's economy. Debilitating effects arising from circumstances peculiar to these very poor create a special set of problems for those concerned with the development of children. The welfare child comes to school retarded in skills that promote school success (3, 7, 8, 9, 10) and soon becomes a statistic in the cumulative deficiency phenomenon. Studies of both animals and humans support the contention that deprivation results in damage to every aspect of human development--mental, social, physical, and emotional (1, 4, 5, 13, 14, 15, 16, 17, 18, 19, 20). To this date, no compensatory education program initiated as late as grade one has succeeded in erasing or systematically improving the negative educational effects of severe early deprivation.

The newness of compensatory programming, coupled with the enthusiasm of research workers has often led to biased studies. This investigation was designed to provide insight into the relative effects of differentiated instructional programs for welfare recipient children absentia the Hawthorne Effect. The investigator explored schools in a wide geographical area of Arkansas to locate a long-term existing program employing many features currently viewed as compensatory in nature. This school was compared to two "typical" schools in the same vicinity. No experimental modifications were made in either of the three schools for purposes of the study.

Objectives

The major objectives of this study were:

1. To determine the effects of an elementary school enrichment program on intelligence, personality, and academic achievement of welfare recipient children.
2. To compare the intelligence, personality, and academic achievement gains of welfare recipient children to non-welfare recipient children.
3. To compare the intelligence, personality, and academic achievement gains of children enrolled in an enriched program with children enrolled in regular programs.

METHOD

First, second, and third grade children enrolled in three north central Arkansas schools were selected in September 1966. A total of 574 children were subjects for this study. Approximately 39 percent were welfare recipients (determined by school principals from existing records and knowledge of families).

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Judgment of principals was used to "assign" welfare recipient status to a small number of families who qualified but were "too proud to ask for it."

TABLE 1 Subjects for the Study

	Welfare Recipient	Non-Welfare Recipient	Total
School X	69	160	229
School A	94	142	236
School B	59	50	109
Total	222	352	574

School X developed an enriched program of instruction over a ten-year period. The model facilities include central library, shower, health and food facilities, outside entry to each classroom, auditorium and cafeteria, health nurse, part-time psychologist, full-time principal, dental provisions, arts and crafts room, and ample play areas. Over half the staff members had earned the Masters degree; consultants, in-service programs, and child study activities were conducted. Regularly scheduled home visitations and parent-teacher conferences were held. Numerous organizational and curricula modifications were evident in individual classrooms--e.g., individualized reading, flexible grouping, multi-level classes, small and large group projects, flexible use of instructional supplies, and pupil-teacher planning. This school (designated School X) represents the experimental or enriched school. No curricula modifications were made for purposes of this study.

The control schools (designated School A and School B) draw from the same geographical area. This area is in one of the severely impoverished rural counties located in the foothills of the Ozark mountains. Schools A and B represent the typical school in this area. Central libraries and many other appropriate instructional supplies were absent. None of the teachers involved in the study from these two schools had earned advanced degrees; two were not fully certified. Basal materials were the primary sources of instruction. Health and other special services facilities were not available. The principal contact with parents was through report cards. During the progress of this study, federal funds were beginning to stimulate change through the provision of funds from the Elementary and Secondary Education Act of 1965. One Title I instructional project (School A) is assessed in this report. Children involved in School A's special program were taken from the regular classroom daily for small group, intensive instruction in reading and arithmetic.

Procedures

The California Test of Personality, the California Short Form Mental Maturity Test, and the California Achievement Test (complete battery) were administered to all subjects during September 1966 (achievement tests were not administered to first grade children). A different form of the same series was administered by the regular classroom teachers under the direction of counselors and principals.

RESULTS AND DISCUSSION

The data in this study were analyzed by means of analysis of variance routines prepared in the College of Education, The University of Texas at Austin, for the CDC 6600 Computer. The procedures employed in the routines were based on between groups analysis of variance formulae presented in B. J. Winer (1962): Statistical Principles in Experimental Design, New York: McGraw-Hill.

The names of the variables are given in Table II. Appendix I describes the analyses.

TABLE @ Names of Variables

Variables 1 - 6	Pre-Test Scores
Variables 7 - 12	Post-Test Scores
Variables 13 - 18	Gain Scores (Post--Pre)
Variables 1 - 7 - 13	Personality Test Scores
Variables 2 - 8 - 14	Mental Maturity Scores
Variables 3 - 9 - 15	Reading Scores
Variables 4 - 10 - 16	Arithmetic Scores
Variables 5 - 11 - 17	Language Scores
Variables 6 - 12 - 18	Total Achievement Scores

The analyses tested for differences between groups defined by school attended and either sex, welfare status of family, and special or regular program, for grades 1, 2, and 3. Analyses 1, 2, and 3 are one way for differences between means for each school for grades 1, 2, and 3.

Examining variables 1 through 6, we note that in many cases significant differences were obtained between the means for the pre-test, thus necessitating the use of the "gain" score. This score is defined by subtracting the pre-test score from the post-test score for each subject on each variable. This procedure was performed by the program, and subjects missing, pre- or post-test scores, or both, were eliminated from the analysis. The analysis of the gain scores are those of variables 13 - 18, as reported in Table II. The analyses of gain scores are contaminated by the fact that the groups were drawn from populations with different means, as indicated by the pre-test analyses. We might expect the group with the higher pre-test mean to exhibit greater gains, due to their superior ability or adjustment.

Grade 1 presents a special problem since there are no pre-test scores for Reading, Arithmetic, Language, or Total scores for Personality and Mental Maturity. Since significant differences between groups are noted in most analyses of variables 1 and 2, the gain scores are used to test differences between the group means for Personality and Mental Maturity (variables 13 and 14), while post-test scores are employed to test differences between groups for Reading, Arithmetic, Language, and Total Achievement (variables 9, 10, 11, and 12). Hence, we must make the assumption that the first grade groups were equivalent at the time of the pre-test. It should be noted that only significant differences are reported in most of the following analyses. Raw

scores were converted to stanines (a form of standard score with a mean of standard score with a mean of five and range of one to nine) before computer analysis.

Hypotheses

1. The mean gain scores (grades 2 and 3) of the students in the three schools are computed from samples drawn from populations having the same mean.

2. The mean gain scores of the main effect groups (defined by sex and school) for each variable are computed from samples drawn from populations having the same mean.

3. There is no significant interaction between the effects of sex and school.

4. No differences between the grade-level groups are attributable to welfare status of family, or to the interaction of welfare status and school attended.

5. There are no significant differences due to the interaction of the program and grade effects.

6. No significant difference exists between the number of siblings for welfare recipient and non-welfare recipient children.

ONE WAY ANALYSES FOR DIFFERENCES BETWEEN SCHOOLS

The null hypothesis tested (alpha $< .05$) for each variable was: the mean gain scores (except for Grade 1) of the students in the three schools are computed from samples drawn from populations having the same mean.

Grade One - Significant Differences

No Personality scores for School X students on post-test.

Reading. Reject H_0, $P = .0238$, School B students obtained highest mean, School A next highest, and School X lowest.

Language. Reject H_0, $P = .0017$, School B highest, School X next, School A lowest.

Total Achievement. Reject H_0, $P = .0015$, same order as above.

In general, School B students exhibited higher post-test scores, followed by School X, then School A.

Grade Two - Significant Differences

Reading. Reject H_0, $P = .0001$, School A students had highest mean gain score, School X next, and School B had lowest mean gain.

Arithmetic. Reject H_0, $P < .00005$, same order as above.

Language. Reject H_0, $P < .00005$, same order as above.

Total Achievement. Reject H_0, $P < .00005$, same order as above.

Generally, students in School A made greatest gains from pre- to post-test, followed by those in School X, then those in School B.

Grade Three - Significant Differences

Mental Maturity. Reject H_0, P = .0254, students in School B made greatest gains, followed by students in School A, then School X.

Language Score. Reject H_0, P = .0155, students in School B made greatest gains, followed by School X, then School A.

Summary

Results indicate that quite probably some influences other than those considered in the design (influence of schools' program and grade level) were operating. The results are not consistent for schools. School B students appear to be superior in the first grade, followed by School X, then School A. School A students consistently made greatest gains in the second grade followed by School X, then School B. School B students appeared to make highest gains in third grade. The enriched program in effect in School X did not lead to superior gain or post-test scores when compared to scores of students in School A and School B.

TWO WAY ANALYSIS - SEX BY SCHOOL

The null hypotheses tested here are:

1. The mean gain scores of the main effect groups (defined by sex and school) for each variable are computed from samples drawn from populations having the same mean.

2. There is no interaction between the effects of sex and school.

Grade One - Significant Differences

The school main effect significant differences are as reported in the previous analyses. No significant interactions were observed.

Language. Reject H_0, P = .0281, females had a higher post-test mean than did the males.

Grade Two - Significant Differences

The school main effect significant differences were as reported in previous analyses. No significant sex main effects or interactions were observed.

Grade Three - Significant Differences

No sex differences were found; the school differences were as in the previous analyses. The following interactions were significant:

Mental Maturity. Reject H_0, P = .0232, a significant interaction between sex and school was observed. This was due to the difference between the School B males and females, the females mean being higher than the males, which is not the case for the other two schools. This indicates that sex or school attended alone are not sufficient to predict gain scores for these samples.

Reading. Reject H_0, P = .0521, a significant interaction between sex and school was observed. This was due again to the School B students. The mean gain for the males was quite a bit lower than for the females, reversing the trend in the other two schools.

Summary

No startling differences between males and females were noted. The two significant interactions indicate that the differences between the males and females in School B were in opposite directions to the differences in School A and School X. No superiority in gains was noted for the School X students.

TWO WAY ANALYSIS - WELFARE STATUS BY SCHOOL

The null hypotheses tested were that no differences between the groups were attributable to welfare status of family, or to the interaction of welfare status and school attended.

Grade One - Significant Differences

School differences were as obtained previously. Significant differences due to welfare status main effect were:

Mental Maturity. Reject H_0, P = .0001, children of families not on welfare made a significantly higher mean post-test score.

Reading. Reject H_0, P .00005, children of families not on welfare made a significantly higher mean post-test score.

Arithmetic. Reject H_0, P = .0001, children of families not on welfare made a significantly higher mean post-test score.

Language. Reject H_0, P = .0003, children of families not on welfare made a significantly higher mean post-test score.

Total Achievement. Reject H_0, P < .00005, children of families not on welfare made a significantly higher mean post-test score.

The following significant interactions were obtained:

Mental Maturity. Reject H_0, P = .0001, this interaction was due to the fact that the students from families on welfare at School X did much poorer than those in School A and School B.

Reading. Reject H_0, P = .0049, again the School X students from families on welfare did much poorer than those from School A and School B.

Arithmetic. Reject H_0, P = .0165, for the same reason as above.

Language. Reject H_0, P = .0001, School X students from families on welfare again did much worse than those from School A and School B.

Total Achievement. Reject H_0, P = .0005, for the same reason as above.

Grade Two - Significant Differences

The welfare status main effect and the interaction effect produced no significant differences between the groups. The differences due to the School main effect were as expected from the first set of analyses.

Grade Three - Significant Differences

No significant differences were obtained.

Significant pre-test differences between students whose parents are and are not on welfare are as follows:

Welfare students were significantly lower than non-welfare on the following variables of the pre-test:

Grade 1

Personality. $P = .003$

Mental Maturity. $P < .00005$

Grade 2

Mental Maturity. $P < .00005$

Reading. $P = .0002$

Arithmetic. $P = .0053$

Language. $P = .0015$

Total Achievement. $P = .0004$

Grade 3

Mental Maturity. $P = .0001$

Reading. $P < .00005$

Arithmetic. $P = .0038$

Language. $P < .00005$

Total Achievement. $P = .0001$

Summary

School X children exhibited dificient post-test performance, but these differences disappeared in grades two and three. Non-welfare children demonstrate significantly higher achievement in academic areas--mental maturity and total achievement, with the greatest deficiencies for welfare children in reading and language. Lesser differences are noted between welfare and non-welfare children in arithmetic.

TWO WAY ANALYSIS - GRADE BY PROGRAM

FOR SCHOOL A ELEMENTARY SCHOOL GRADES TWO AND THREE

The null hypotheses tested were:

1. There are no significant diffferences due to the type of program (special or regular) main effect.

2. There are no significant differences due to the interaction of the program and grade effects.

Significant Differences

Differences due to program type main effect:

Reading. Reject H_0, $P < .00005$, children not in special program made a significantly lower, in fact, negative gain when compared to the students in the special program.

Arithmetic. Reject H_0, $P < .0005$, same direction as Reading.

Language. reject H_0, $P < .00005$, children in special program made superior gains when compared to children not in special program.

Total Achievement. Reject H_0, $P < .00005$, same as above.

Differences due to grade main effect:

Reading. Reject H_0, $P = .002$, third graders made superior gains when compared to second graders.

Total Achievement. Reject H_0, $P = .0015$, third graders made superior gains in total achievement when compared to second graders.

Differences due to interaction of type of program and grade:

Reading. Reject H_0, $P = .0301$, difference due to third grade, special program making very superior gains.

Summary

Children enrolled in School A Special Program made significantly higher gains than children not in the Special Program. Third graders amde greater gains than second graders. Third grade children in Special Program made very superior gains.

TWO WAY ANALYSIS - WELFARE STATUS BY
NUMBER OF SIBLINGS FOR TOTAL SAMPLE

The hypothesis tested was:

No significant difference exists between the number of siblings for welfare recipient and non-welfare recipient children.

TABLE 3

Comparison of Number of Siblings for Welfare and Non-Welfare Children

N Siblings	Welfare Frequency	Non-Welfare Frequency
0	7	16
1	21	95
2	34	108
3	47	60
4	32	33
5	22	11
6	16	4
7	19	1
8	9	3
9	2	0
10	1	0
11	2	0
12	2	0
$\overline{X}$	3.94	2.21

Reject null hypothesis. Difference significant, P .01.

Summary
Rounding to the nearest whole number and assuming two parents living at home, including respondent, the average size welfare recipient family was seven. The average size non-welfare recipient family was five.

CONCLUSIONS AND IMPLICATIONS

1. There was no pattern of superiority for either of the three schools in regard to the achievement of all enrollees (welfare and non-welfare), ~~including~~ ~~[redacted]~~ The enriched program at School X appears to be no better nor worse than the programs at School A and School B as measured by the variables employed in this analysis. The welfare children in the control schools performed significantly higher on all academic criteria then welfare recipient children

in the experimental school. This suggests that compensatory programs based upon common assumptions have little positive effect on disadvantaged (welfare recipient) children and that experimental programming efforts become oriented toward truly creative approaches. A second alternative, supported by considerable evidence, is that compensation attempts must begin before the child enters the elementary school. A innovative combination of the two alternatives appears to be our primary hope in the education of the disadvantaged child.

2. Welfare recipient families were larger than non-welfare families (seven and five, respectively). They perform at a significantly lower level than non-welfare recipients on academic tests (mental maturity, reading, language, and arithmetic). The differences are greatest in reading and language. Personality development (California Test of Personality) for rural welfare recipient children does not correspond with the low level of academic achievement. Significant differences between welfare and non-welfare children were noted only on the pretest of grade one. This indicates that the operational programs studied are enjoying success in promoting personality development. Examination of school, home, and community factors promoting or detracting from personality development in rural vs. urban environments appears to be relevant in this context. The prevailing status of academic deficiency for welfare recipient children suggests that such status contains inherent variables for promoting school failure. The welfare condition should be examined for educational implications. This study, for example, suggests that primary level rural welfare recipient children are not personality misfits because of their status but may eventually become so because of their sustained academic failure. It should also be noted that some families who qualified for welfare aid (food or money) were "too proud to ask for it." In the words of one mother of seven children, "I'd rather do without than beg."

3. No startling differences in achievement for males and females were noted. The two significant interactions indicate that the differences between the males and females in School B were in opposite directions to the differences in School A and School X.

4. Children enrolled in the School A Special (Title I) Program (grades two and three) made significantly higher gains than children not in the Special Program. Third grade children made very superior gains. This conclusion implies that concentrated, small group instruction is superior to large group "enriched instruction" or "regular instruction" for promotiing academic achievement. The children enrolled for special instruction in the Title I program of School A made greater gains than any other group evaluated in this study. The significant stanine gain in total achievement for children in the School A Special Program was 3.42 compared to 0.54 for children in the School A regular program. Sixty percent of the Special Program enrollees were welfare recipient. The comparatively smaller N for this group implies a guarded conclusion with a recommendation for further comprehensive analysis of similar programs.

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APPENDIX I

Types and Descriptions of Analyses

I. One Way Analyses for Differences Between Schools for Grades 1, 2, and 3

School 1 =

School 2 =

School 3 =

Cells:

COLUMN

	1	2	3
ROW I	School A	School X	School B

II. Two Way Analysis, Sex by School for Grades 1, 2, and 3

A_1 = Male

A_2 = Female

B_1 = School A

B_2 = School X

B_3 = School B

Cells

COLUMNS

ROWS	B_1	B_2	B_3
A_1	Male School A	Male School X	Male School B
A_2	Female School A	Female School X	Female School B

III. Two Way Analysis, Welfare Status by School for Grades 1, 2, and 3

A_1 = Children of families on welfare

A_2 = Children of families not on welfare

B_1 = School A

B_2 = School X

B_3 = School B

Cells:

COLUMNS

ROWS	B_1	B_2	B_3
A_1	Welfare School A	Welfare School X	Welfare School B
A_2	Not Welfare School A	Not Welfare School X	Not Welfare School B

IV. Two Way Analysis, Grade by Special or Regular Program for School 1 (School A), Grades 2 and 3

A_1 = Children in Special Program

A_2 = Children not in Special Program

B_1 = Grade 2

B_2 = Grade 3

COLUMNS

Cells:

ROWS	B_1	B_2
A_1	Special Program Grade 2	Special Program Grade 3
A_2	Regular Program Grade 2	Regular Program Grade 3